Supported by a grant from Iceland, Liechtenstein and Norway through the EEA Financial Mechanism.
Operated by Universidad Complutense de Madrid

NILS mobility project

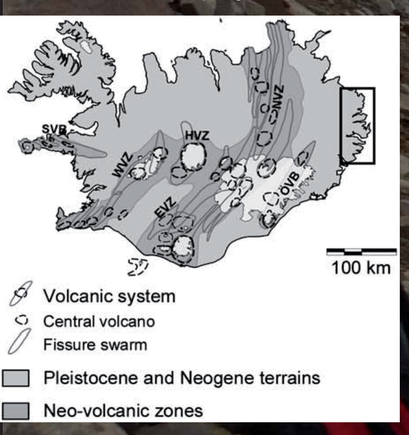
ICELAND LIECHTENSTEIN NORWAY eea grants

UCM-EEA Abel Extraordinary Chair. Coordinated Mobility of Researchers. NILS Science and Sustainability (ES07)

"FLOWS AND BLOWS OF THE ICELANDIC PAST: APPLICATION OF ROCK MAGNETISM TO UNRAVEL TRANSPORT DYNAMICS OF NEOGENE VOLCANIC ERUPTIONS IN EASTERN ICELAND" (004-ABEL-CM-2014A)

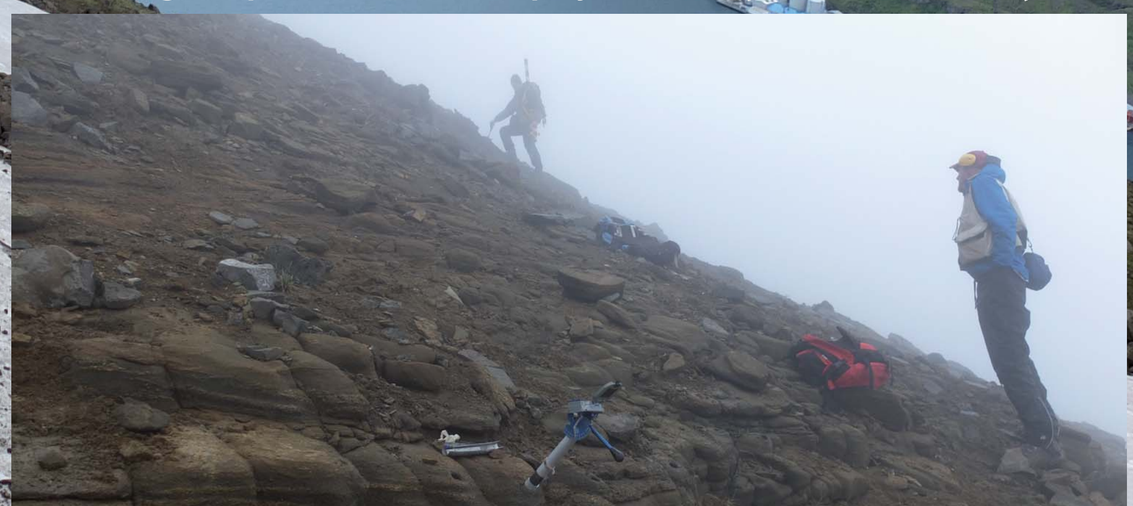
VICENTE CARLOS RUIZ MARTÍNEZ (vcarlos@ucm.es) & MORTEN RIISHUUS SCHIOLDAN (riishuus@hi.is)

Coordinators at project promoter (Fac. C.C. Físicas, Universidad Complutense de Madrid) & at partner institution (Nordic Volcanological Center, Institute of Earth Sciences, University of Iceland)

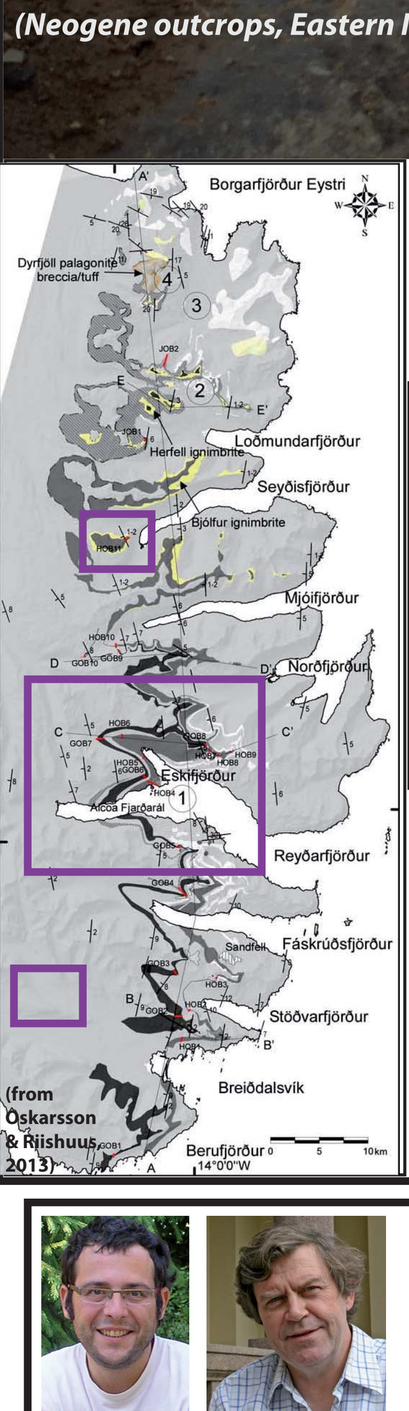


Bardarbunga eruptions: the research project was only initiated in mid July 2015

OBJECTIVES:
To achieve a deeper understanding of the surface dynamics of volcanic processes at oceanic spreading ridges, a pplying paleomagnetic and anisotropy of magnetic susceptibility (rock fabric) studies to determine flow direction and vent sources for specific volcanic deposits where structural field evidence is available (Neogene outcrops, Eastern Iceland).



Magnetic data reduction and interpretation are still in progress...



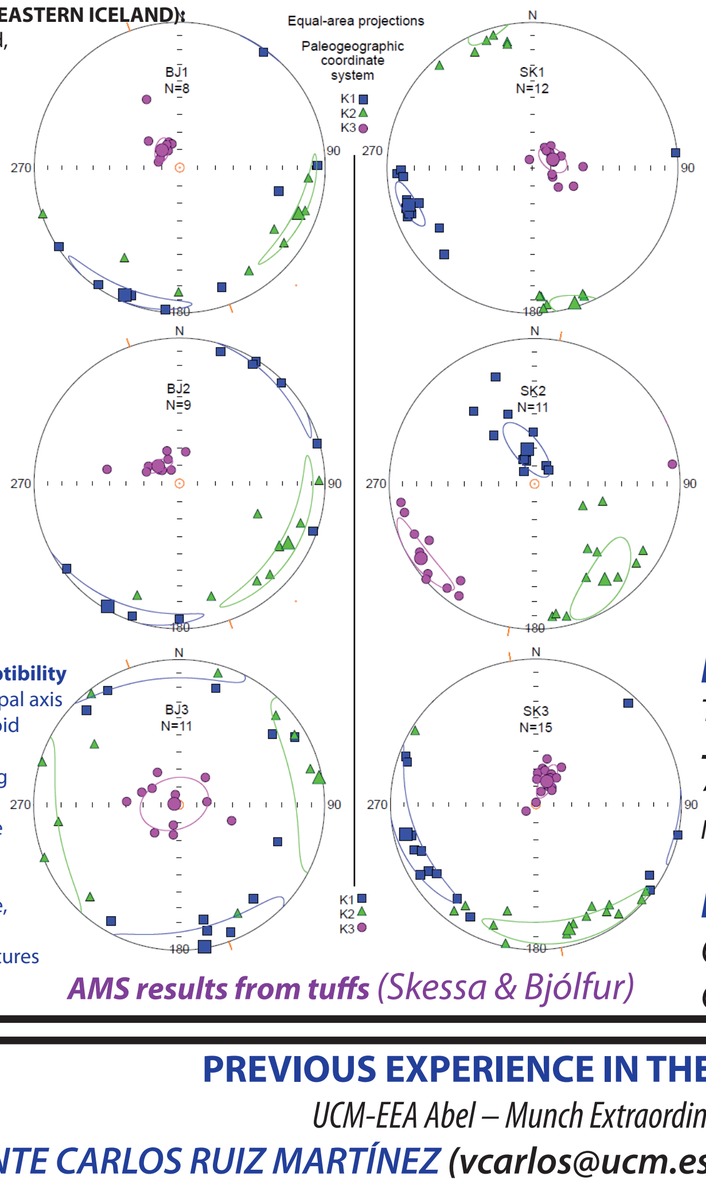
(from Óskarsson & Riishuus, 2013)

ACTIVITY 1: FIELDWORK (EASTERN ICELAND):

A total of 213 cores were drilled, individually oriented, and retrieved from 24 sites: tuffs (6); olivine and aphyric basalt groups (7+5); other lava flows (3), dikes (2) and a redbed sedimentary unit (1)

Legend
- Strike/dip
- Cross sections
- Stratigraphic sections mapped
- Central volcano
- Ljósá olivine basalt group
- Grjótá olivine basalt group
- Hólmar olivine basalt group
- Jónsfjall olivine basalt group
- Undifferentiated lava flows
- Agglomerates
- Ignimbrites/Pyroclasts
- Composite lava flows
- Silicic and intermediate lava flows
- Silicic intrusion
- Dolerite sills
- Palagonite breccia/tuff

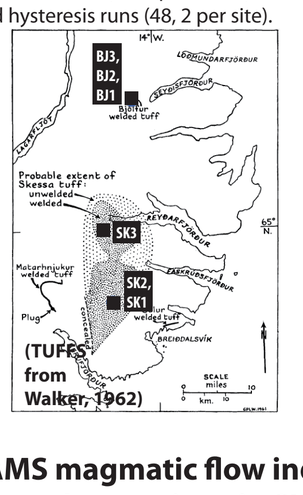
METHODOLOGY:
Anistropy of magnetic susceptibility (AMS): Directions of the principal axis (K1> K2> K3) of the AMS ellipsoid of volcanic rocks are related with their petrofabric, recording magmatic dynamics.
Paleomagnetism: Remanence directions preserved rocks will characterize polarity stratigraphy of the volcanic pile, tectonic disrupments, and the geomagnetic field features in the past.

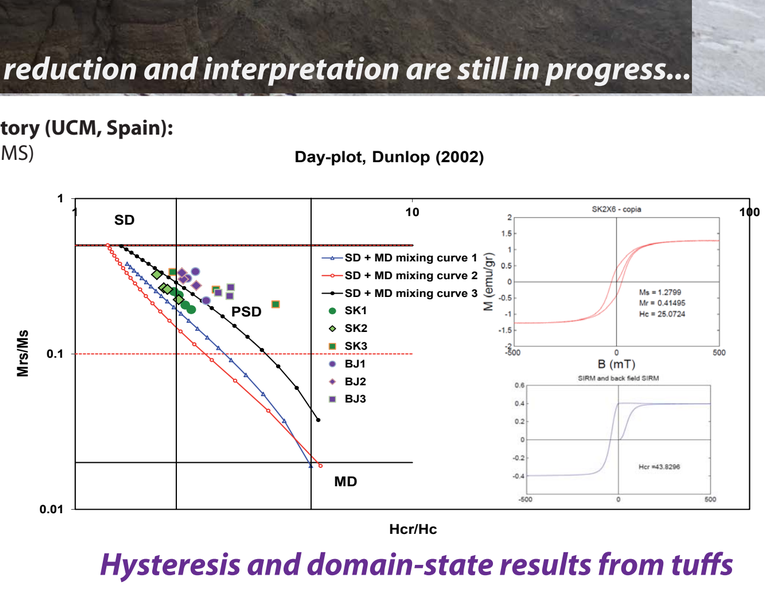


AMS results from tuffs *(Skessa & Bjólfur)*

ACTIVITY 2: Paleomagnetic laboratory (UCM, Spain):

Anisotropy of magnetic susceptibility (AMS) measurements (408 specimens) and hysteresis runs (48, 2 per site).





Hysteresis and domain-state results from tuffs

ACTIVITY 3: Interpretation.

AMS magmatic flow indicators are congruent with the available volcanologic observations in SK tuff (NE directed), and provide new clues in BJ tuff (NW directed), whose eruptive source is unknown so far.

Publications:

The first one will be related to the results of volcanic tuffs (Skessa & Bjólfur):

- ***M. S. RIISHUUS & V. C. RUIZ-MARTÍNEZ (2016) :***
"Magnetic fabrics of Neogene pyroclastic density currents from eastern Iceland".
IX CONGRESO GEOLÓGICO DE ESPAÑA (Huelva, 12-14/ 09/ 2016). Accepted in GEOTEMAS (ISSN: 1576-5172)

Further collaboration / projects:

On-going (project-related) AMS, paleomagnetic and volcanological research.
Guiding of icelandic & spanish students (related-) research. No funds yet.

PREVIOUS EXPERIENCE IN THE NILS PROGRAM :

UCM-EEA Abel – Munch Extraordinary Chair (2010)

VICENTE CARLOS RUIZ MARTÍNEZ (vcarlos@ucm.es, Fac. C.C. Físicas, Universidad Complutense de Madrid)
In cooperation with the host group members:
TROND H. TORSVIK (t.h.torsvik@geo.uio.no) & DOUWE J.J. VAN HINSBERGEN (now at D.J.J.vanHinsbergen@uu.nl)
20 weeks –stay at the Centre for Physics of Geological Processes (PGP), Faculty of Mathematics and Natural Sciences, University of Oslo

Research lines:

Paleomagnetism applied to global-to-local plate tectonic reconstructions and paleogeographies combined with lithospheric and mantle dynamics.

Publications:

- ***V.C. RUIZ MARTÍNEZ, T.H. TORSVIK, D.J.J. VAN HINSBERGEN*** *& C. Gaina (2012).*
Earth at 200 Ma: Global palaeogeography refined from CAMP palaeomagnetic data.
Earth and Planetary Science Letters, 331, 67-79; DOI: 10.1016/j.epsl.2012.03.008
Impact Factor: 4.349 (2012 JCR Science Edition);
Q1 (4 / 76 , "GEOCHEMISTRY & GEOPHYSICS" category)

- *A. Palencia-Ortas,* ***V.C. RUIZ MARTÍNEZ****, J.J. Villalaín, M.L. Osete, R. Vegas, A. Touil, A. Hafid, G. McIntosh,* ***D.J.J. VAN HINSBERGEN, T.H. TORSVIK*** *(2011).*
A new 200 Ma paleomagnetic pole for Africa, and paleo-secular variation scatter from Central Atlantic Magmatic Province (CAMP) intrusives in Morocco (Ighrem and Foum Zguid dykes).
Geophysical Journal International, 185 (3), 1220-1234, doi: 10.1111/j.1365-246X.2011.05017.x
Impact Factor: 2.420 (2011 JCR Science Edition);
Q2 / T1 (22 / 76, "GEOCHEMISTRY & GEOPHYSICS" category)

V.C. Ruiz-Martínez et al. / Earth and Planetary Science Letters 331-332 (2012) 67–79